A Working Group Draft Standard of the Joint Committee

NTCIP 1404 v. 1.03

-- DRAFT Amendment 1

Transit Communications Interface Profiles

Part of the National Transportation Communications for ITS Protocol

Standard on Scheduling/Runcutting (SCH) Objects

Draft September 2002

Also referenced as TCIP-SCH

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FOREWORD

This document uses only metric units.

This document is an NTCIP Information Data Dictionary Standard. Information Data Dictionaries Standards formally express management information in terms of objects (data elements, data frames, and messages) for use within TCIP and NTCIP systems.

The TCIP family of standards addresses Advanced Public Transportation Systms (APTS) data interfaces and related automated transit tools and data. The standards address the business requirements of these APTS data interfaces. In some cases, specialized terms were needed to define general classes of information. For example, different business areas needed to define data elements related to time, date and footnotes. Special, constrained data types were developed so that the transit domain data concepts were consistent across business areas, while specific needs were met. These data types are defined within the TCIP family of standards and in this document.

For more information about NTCIP standards, visit the NTCIP Web Site at http://www.ntcip.org. For a hardcopy summary of NTCIP information, contact the NTCIP Coordinator at the address below.

In preparation of this NTCIP document, input of users and other interested parties was sought and evaluated. Inquires, comments, and proposed or recommended revisions should be submitted to:

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Approvals

This document will be separately balloted and approved by AASHTO, ITE, and NEMA after recommendation by the Joint Committee on the NTCIP. Each organization is expected to approve this NTCIP Information Data Dictionary Standard as the following standard type, as of the date:

AASHTO – Standard Specification; Month YYYY
ITE – Software Standard; Month YYYY
NEMA – Standard; Month YYYY

History

From 1997 to 1999, this document was referenced as ITE ST-ITS-TCIP-SCH and/or NEMA TS 3.TCIP-SCH. However, to provide an organized numbering scheme for the NTCIP, this document is now referenced as NTCIP 1404. The technical specification of NTCIP 1404 is identical to the former reference, except as noted in the development history:

TCIP documents version 0.1. Distributed in September 1997 for public review.

TCIP-SCH version 1.0, February 20, 1998. Accepted as a Recommended Standard. Changed to version 1.1, July 31, 1998. Revisions included: former section numbers 2.1, 2.3, 4.3, 5.1, and 5.2.

NTCIP 1404 version 97.01.01, July 31, 1998. Approved by AASHTO in July 1999, approved by ITE in October 1999, and approved by NEMA in February 2000.

NTCIP 1404 v01.02, December 1, 2000. Prepared for printing: incremented version number and updated date; added and revised front matter; updated references to NTCIP and NEMA document numbers in References Clauses; updated references to ITE document numbers; revised section numbering; inserted introduction text in Section on Requirements; deleted Annex A Comment Form; and inserted introduction text in Annex on the ASN.1 Script.

Draft NTCIP 1404 v01.03 Amendment 1, September 2002. Updated data dictionary to conform to IEEE 1489:1999 and IEEE 1488:2000. Corrected typographic errors. Revised definitions, message bodies and added new data elements and messages.

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Section 1
GENERAL

1.1.2 Normative References

-- Updated the publications information for Normative References

draft NTCIP 1400:2002 Amendment 1, *Transit Communications Interface Profile Framework*, version 1.05 Amendment 1.

draft NTCIP 1401:2002 Amendment 1, *Transit Communications Interface Profile*, *Standard on Common Public Transportation Objects*, version 1.03 Amendment 1, September, 2002.

draft NTCIP 1405:2002 Amendment 1, *Transit Communications Interface Profile, Standard on Spatial Representation Objects*, version 1.03 Amendment 1, September, 2002.

draft NTCIP 1407:2002 Amendment 1, *Transit Communications Interface Profile, Standard on Control Center Objects*, version 1.03 Amendment 1, September, 2002.

ISO/IEC 8824:1998, *Abstract Syntax Notation One* (ASN.1)

1.1.3 Other References

-- Updated the publications information for Informative References

IEEE Std 1489-1999, *IEEE Standard for Data Dictionaries for Intelligent Transportation Systems.* 27 October 1999.

IEEE Std 1488-2000, *IEEE Trial-Use Standard for Message Set Template for Intelligent Transportation Systems*. 13 July 2000.

Section 2
TERMINOLOGY

-- No changes

Section 3
CONCEPT OF OPERATIONS

-- Modified section title to Concept of Operations

-- Added new section, 3.2.2

3.1.2 Scheduling Processes

The scheduling component of transit includes three key processes to define and manage transit service: schedule writing, block building and run-cutting. The final result is the schedule production. Transit agencies differ in the level of optimization applied at each process.

3.1.2.1 Schedule Writing

Schedule writing is the process of creating a route and defining the service that will operate that route. A route is defined by one or more patterns – the geographic paths over which trips travel. Patterns may contain many types of points and events, including timepoints, bus stops, transfer points, fare zone changes, destination sign changes, transit signal priority triggers, operator road relief points, automated announcements to passengers and other messages to the operator.

Timepoints are exact locations along routes where trips are assigned specific arrival and departure times. Running time is defined between any two consecutive timepoints , called a timepoint interval, and may be used as a system-wide default for all routes traveling between the pair. Some agencies maintain a separate running time table for each route, in order to more accurately reflect the different operating conditions affecting various routes. Trips are built from the time at a particular timepoint in a particular pattern using either the system or route level default running times between the remaining timepoint pairs in the pattern.

3.1.2.2 Block Building

Once schedules are written, the block building process combines a series of consecutive trips into vehicle assignments in order to minimize the number of coaches and platform hours. A block, also known as a vehicle assignment, includes everything a coach is assigned to do from the time it pulls out of the vehicle base until it pulls in. Different vehicle types are assigned to specific trips or routes based on ridership requirements or other characteristics of the route. The block building process determines the amount of layover or recovery time that a coach will have between scheduled revenue trips. This is also the process that identifies the deadhead trips that might be needed to move a coach from last terminal of one route to the first terminal of another so that all trips are operated efficiently.

3.1.2.3 Run-Cutting

Run-cutting is the final step in the scheduling process, in which vehicle assignments are cut into operator assignments. A short vehicle assignment may require just one operator, while longer vehicle assignments may require several operators throughout the day. Some pieces of work may be combined to create a split shift assignment for a guaranteed 8-hour day. The goal of the run-cutting process is to efficiently distribute the work so that overall costs are minimized given union contract rules, pay rates, work rules and management requirements.

3.1.2.4 Going Into Production

When these three scheduling processes are complete, the scheduling data are transmitted or published to the rest of the transit agency for implementation, as summarized in Section 3.2.3 Outputs.

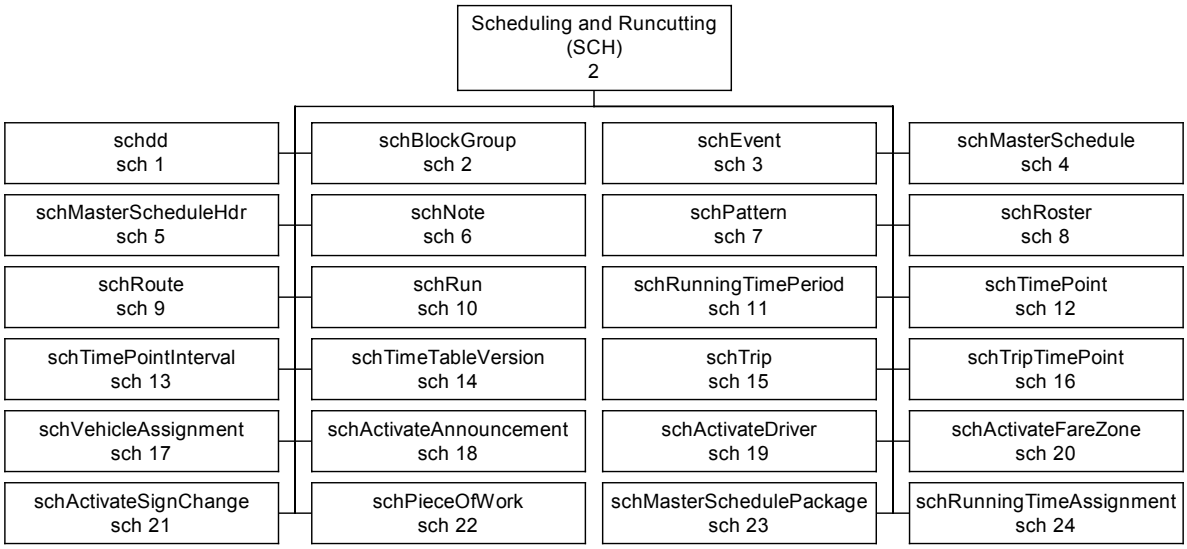
3.1.3 Outputs

-- Incremented section number from 3.2.2 to 3.2.3.

3.3.2 TCIP Classification Tree

-- update Figure 3.2 Classification Tree to include two new messages:
SchMasterSchedulePackage_message (sch 23)
SchRunningTimeAssignment_message (sch 24)

Figure 4.2 Classification Scheme



3.4 NAMING CONVENTION

-- add clarification of indexing types

The Scheduling/Runcutting Business Area describes three types of indices, and imports a fourth type from the Control Center Business Area. The types are described below.

Designator	An alphanumeric name with up to 8 characters. Typically associates legacy data with updated identification schemes
Id	A numeric identifier (16 to 32 bits)
IdShort	A short numeric identifier used for constrainted bandwidth applications (such as over the radio link). (8 bits or less)
Name	A descriptive name with up to 30 characters

Section 4
REQUIREMENTS

-- updated the following requirements in Sections 4.1 and 4.2

4.1 SCHEDULING/RUNCUTTING DATA DICTIONARY

SCH_ActivationID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_ActivationID_id
Definition	A unique number assigned to an activation event.
Representation class term	identifier

SCH_ActivationType_cd

(1) The error codes were removed from the code list.

Representation layout	SCH-ActivationType ::= INTEGER { annTrigger(1), -- announcement trigger routeAdhOverride(2), -- route adherence override signChange(3), -- sign change msgTrigger(4), -- driver message trigger/paddle (relief point) fareZone (5), -- fare zone radioZone (6), -- radio zone reliefTrigger (7), -- relief trigger beginLayover (8), -- Begin Layover endLayover (9), -- End Layover beginTrip (10), -- Begin Trip endTrip (11), -- End Trip beginDeadhead (12), -- Begin Deadhead endDeadhead (13) -- End Deadhead -- 14-149 reserved -- 150-255 local use } (0..255)
Valid value rule	1 Announcement trigger 2 Route adherence override 3 Sign change 4 Driver message trigger/paddle (relief point) 5 Fare zone 6 Radio zone 7 Relief trigger 8 Begin Layover 9 End Layover 10 Begin Trip 11 End Trip 12 Begin Deadhead 13 End Deadhead 14-149 Reserved 150-255 Local Use

SCH_ActivationTypeDescription_txt/UCS

(1) This data element was retired. Remarks indicates that the data element is replaced with CPT_CodeDescription_txt.

Remarks	This data element is retired. Use CPT_CodeDescription_txt instead.

SCH_AnnouncementID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_AnnouncementID_id
Definition	A unique number assigned to an announcement within a transit agency.
Representation class term	identifier

SCH_AnnouncementLocationID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified. Included additional guidance to Remarks.

Descriptive Name	SCH_AnnouncementLocationID_id
Definition	A unique number assigned to an announcement location within a transit agency.
Remarks	The functional address that identifies the device that received the announcement. This may refer to a vehicle annunciator, station annunciator, or other audio-facility. This data element is user-defined.
Representation class term	identifier

SCH_BlockDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_BlockDesignator_id/UCS
Definition	A unique alpha-numeric designator (identifier) of a vehicle assignment.
Representation class term	identifier

SCH_BlockGroupName_txt/UCS

(1) The definition was modified.

Definition	The name given to a grouping of vehicle assignments.

SCH_BlockID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_BlockID_id
Definition	A unique number assigned to a vehicle assignment. Typically, the assignment is

given within a day type that is used to associate a sequence of trips to a transit vehicle.

Representation class term identifer

SCH_BlockName_txt/UCS

(1) The definition was modified.

Definition The name of a vehicle assignment. For legacy systems the block name often identifies the major route served by the block and the pull out sequence.

SCH_DayType_cd

(1) The error codes were removed from the code list.

Representation layout

```
SCH-DayType  ::= INTEGER {
  sunday (1),   -- Sunday
  monday (2),   -- Monday
  tuesday (3),   -- Tuesday
  wednesday (4),   -- Wednesday
  thursday (5),   -- Thursday
  friday (6),   -- Friday
  saturday (7),   -- Saturday
  holiday (8),   -- Holiday
  weekday (9),   -- Weekday
  weekend (10),   -- Weekend
  weekdaySchoolClosed (11) -- Weekday, school closed
    -- 12-149 reserved
    -- 150-255 local use
} (0..255)
```

Valid value rule

1 Sunday
2 Monday
3 Tuesday
4 Wednesday
5 Thursday
6 Friday
7 Saturday
8 Holiday
9 Weekday
10 Weekend
11 Weekday, school closed
12-149 Reserved
150-255 Local use

SCH_DayTypeDescription_txt/UCS

(1) The definition was modified.

Definition The description of a user-defined SCH_DayType_cd (local use code) type of day that affects transit service.

SCH_NoteDeisgnator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).

Descriptive Name SCH_NoteDeisgnator_id/UCS

Representation class term identifier

SCH_NoteID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).

Descriptive Name SCH_NoteID_id

Representation class term identifier

SCH_OperatingTimeType_cd

(1) The error codes were removed from the code list.

Representation layout

```
SCH-OperatingTimeType  ::= INTEGER {
  deadhead(1),   -- Deadhead Time
  dwell(2),   -- Dwell Time
  layover(3),  -- Layover Time
 makeUp (4),  -- Make Up Time
 overtime (5),  -- Overtime
 pullIn (6),  -- PullIn Time
 pullOut (7),  -- PullOut Time
 spread (8),  -- Spread Time
 travel (9),  -- Travel Time
 turnInAllowance (10),  -- TurnInAllowance
 report (11),  -- Report Time
 platform (12),  -- Platform Time
 break (13),  -- Break Time
 mealBreak (14)  -- Meal Break Time
    -- 15-149 reserved
    -- 150-255 local use
  } (0..255)
```

Valid value rule

1. Deadhead Time- Bus travel time in non-revenue bus travel time to or from the garage and a terminus point where revenue services begins or ends; or within a vehicle assignment from the end of one revenue service segment to the beginning of another.
2. Dwell Time- Time scheduled for loading passengers or waiting for them to transfer at a stop point.
3. Layover Time- Scheduled rest and recovery, usually at a terminal.
4. Make Up time- Payment for time in order that the total paid time for an operator assignment is equal to a minimum daily or weekly guarantee.
5. Overtime- Identifies the amount of scheduled time paid beyond the daily guarantee or actually operated beyond the scheduled time.
6. PullIn Time- Deadhead running time allowed a transit vehicle to arrive at the VehicleBase after the final access or time point in the vehicle assignment.
7. PullOut Time- Deadhead running time allowed a transit vehicle to depart the VehicleBase prior to arriving at the first time point in the vehicle assignment.
8. Spread Time- Total elapsed time between the first report time and the final turn-in time of an operator's assignment.
9. Travel Time- A period of time allocated to an operator during which (s)he must travel from one piece of work to another.
10. TurnInAllowance- Paid time for the operator to report to the dispatcher at the conclusion of a run.
11. Report Time- Paid time for the operator to prepare for the start of a run or a piece of work.
12. Platform Time- Time when the operator is scheduled to drive the transit vehicle, including layover time.
13. Break Time- Time when the operator is scheduled to have a rest.
14. Meal Break Time- Time when the operator is scheduled to have a rest (for a meal).
15-149. Reserved
150-255. Local use

SCH_OperatorDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_OperatorDesignator_id/UCS
Definition	A unique alpha-numeric designator of a PT vehicle operator.
Representation class term	identifier

SCH_PatternDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_PatternDesignator_id/UCS
Definition	A unique alpha-numeric designator (identifier) of a pattern.
Representation class term	identifier

SCH_PatternID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_PatternID_id
Definition	A unique number assigned to a pattern.
Representation class term	identifier

SCH_PatternName_txt/UCS

(1) The definition was modified.

Definition	A name given to a pattern.

SCH_PayType_cd

(1) The error codes were removed from the code list.
(2) The definition was modified.

Definition	The pay factor that identifies the amount of money paid for specific types of duties.
Representation layout	SCH-PayType ::= INTEGER { platform (1), -- Platform Time working (2), -- Working Time spread (3), -- Spread spreadBonus (4), -- Spread Bonus overtime(5), -- Overtime overtimeBonus (6), -- Overtime Bonus mealBreakPaid (7), -- Paid Meal break otherBreakPaid (8), -- Other Paid Break travelPaid (9), -- Paid Travel signOn (10), -- Sign-on time

```
  signOff (11),   -- Sign-off time
  earlyShiftBonus (12),  -- Early Shift Bonus
  eveningShiftBonus (13), -- Evening Shift Bonus
  nightShiftBonus (14)  -- Night Shift Bonus
    -- 15-149 reserved
    -- 150-255 local use
} (0..255)
```

Valid value rule

1. Platform Time
2. Working Time
3. Spread
4. Spread Bonus
5. Overtime
6. Overtime Bonus
7. Paid Meal Break
8. Other Paid Break
9. Paid Travel
10. Sign-on Time
11. Sign-off Time
12. Early Shift Bonus
13. Evening Shift Bonus
14. Night Shift Bonus

15-149 Reserved

150-255 Local use

SCH_PullInTime_tm/SI-time

(1) The definition was modified.

Definition The time at which a transit vehicle arrives at its storage facility (vehicle base) at the end of a vehicle assignment.

SCH_PulloutTime_tm/SI

(1) The definition was modified.

Definition The time at which a vehicle pulls out of its storage facility (vehicle base) iat the start of a vehicle assignment.

SCH_RosterDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name SCH_RosterDesignator_id/UCS

Definition A unique alpha-numeric designator (identifier) of a roster.

Representation class term identifier

SCH_RosterID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name SCH_RosterID_id

Definition A unique number assigned to a roster.

Representation class term identifier

SCH_RouteDesignator_id/UCS

(1) The definition was modified.

Definition A unique alpha-numeric designator (identifier) of a route.

SCH_RouteDirectionID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name SCH_RouteDirectionID_id

Definition A unique number assigned to the direction of a route.

Representation class term identifier

SCH_RouteDirectionName_cd

(1) The error codes were removed from the code list.

Representation layout

```
SCH-RouteDirectionName  ::= INTEGER {
 north (1),   -- North
 south (2),   -- South
 east (3),   -- East
 west(4),   -- West
  sw  (5),   -- Southwest
 se  (6),   -- Southeast
 nw  (7),   -- Northwest
ne  (8),   -- Northeast
 in  (9),   -- Inbound
 out (10),   -- Outbound
 circ (11),   -- Circular
 dest (12),   -- Destination
 clockwise(13),  -- Clockwise
counterClock (14), -- Counter-Clockwise
name (15)   -- defined by name of route
    -- 16-149 reserved
    -- 150-255 local use
} (0..255)
```

Valid value rule

1 N
2 S
3 E
4 W
5 SW
6 SE
7 NW
8 NE
9 Inbound
10 Outbound
11 Circular
12 Destination
13 Clockwise
14 Counter-Clockwise
15 (defined by name)
16-149 Reserved
150-255 Local use

SCH_RouteID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_RouteID_id
Definition	A unique number assigned to a route.
Representation class term	identifier

SCH_RouteName_txt/UCS

(1) The definition was modified.

Definition	A name given to a route.

SCH_RunDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_RunDesignator_id/UCS
Definition	A unique alpha-numeric designator (identifier) of a run.
Representation class term	identifier

SCH_RunID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_RunID_id
Definition	A unique number assigned to a run.
Representation class term	identifier

SCH_RunningSpeed_rt/SI-velocity

(1) The definition was modified.

Definition	The average speed maintained between two points.

SCH_RunningTimeActual_tm/SI-time

(1) The definition was modified.

Definition	The actual time for a transit vehicle to travel between two points.

SCH_RunningTimePeriodName_txt/UCS

(1) Revised Descriptive and ASN.1 names (added Name)
(2) The definition was modified.

Descriptive Name	SCH_RunningTimePeriodName_txt/UCS

Definition The name given to a running time period.

ASN1 name SCH-RunningTimePeriodName

SCH_RunningTimeSched_tm/SI-time

(1) The definition was modified.

Definition A time assigned to the movement of a PTV between time points.

SCH_RunType_cd

(1) The error codes were removed from the code list.

Representation layout

```
SCH-RunType  ::= INTEGER {
  amStraigtht (1),  -- AM Straight,
  midStraight (2),  -- Midday Straight,
  pmStraight (3),  -- PM Straight,
  straight (4),  -- Straight,
  cleanup (5),  -- Cleanup,
  owl (6),   -- Owl,
  regular (7),  -- Regular,
 relief (8),   -- Relief,
  split (9),   -- Split,
  threePiece (10),  -- Three Piece (including swing),
  tripper (11),  -- Tripper,
  twoPiece(12)  -- Two Piece (including swing)
     -- 13-149 reserved
     -- 150-255 local use
} (0..255)
```

Valid value rule

1 AM Straight
2 Midday Straight
3 PM Straight
4 Straight
5 Cleanup
6 Owl
7 Regular
8 Relief
9 Split
10 Three Piece (including Swing)
11 Tripper
12 Two Piece (including Swing)
13-149 Reserved
150-255 Local use

SCH_ServiceType_cd

(1) The error codes were removed from the code list.

Representation layout

```
SCH-ServiceType  ::= INTEGER {
  regular (1),   -- Regular,
  express (2),  -- Express,
  circular(3),  -- Circular,
 radial  (4),  -- Radial,
 feeder  (5),  -- Feeder,
 jitney  (6),  -- Jitney,
 limited (7),  -- Limited,
 nonRevenue (8),  -- Non-revenue,
 unknown (9),  -- Unknown,
 charter (10),  -- Charter Service,
```

	school (11), -- School Service, special (12), -- Special Service, operatorTraining (13), -- Operator Training, maintenance (14), -- Maintenance Service, noService (15), -- No Service, standBy (16), -- Stand-by, extra (17) -- Extra, -- 18-149 reserved -- 150-255 local use } (0..255)
Valid value rule	1 Regular 2 Express 3 Circular 4 Radial 5 Feeder 6 Jitney 7 Limited 8 Non-revenue 9 Unknown 10 Charter Service 11 School Service 12 Special Service 13 Operator Training 14 Maintenance Service 15 No Service 16 Stand-by 17 Extra 18-149 Reserved 150-255 Local use

SCH_SignCodeID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).

Descriptive Name	SCH_SignCodeID_id
Representation class term	identifier

SCH_SignLocationID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).

Descriptive Name	SCH_SignLocationID_id
Representation class term	identifier

SCH_StopPointLength_qty/SI-length

(1) The definition was modified.

Definition	The linear length along a curb or parking area at a stop point.

SCH_StopPointSequenceNo_nbr

(1) The definition was modified.

Definition	A unique number assigned to a sequence of bus stops served by a pattern or route.

SCH_TimeBegin_tm/SI time

(1) The definition was modified.

Definition	The beginning time for a time period.

SCH_TimeEnd_tm/SI-time

(1) The definition was modified.

Definition	The ending time for a time period.

SCH_TimePointDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TimePointDesignator_id/UCS
Definition	A unique alpha-numeric designator (identifier) of a time point.
Representation class term	identifier

SCH_TimePointID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TimePointID_id
Definition	A unique number assigned to a time point.
Representation class term	identifier

SCH_TimePointIntervalDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TimePointIntervalDesignator_id/UCS
Definition	A unique alpha-numeric designator (identifier) of a time point interval.
Representation class term	identifier

SCH_TimePointIntervalID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TimePointIntervalID_id
Definition	A unique number assigned to a time point interval.
Representation class term	identifier

SCH_TimeTableVersionID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TimeTableVersionID_id
Definition	A unique number assigned to a time table version.
Representation class term	identifier

SCH_TimeTableVersionName_txt/UCS

(1) The definition was modified.

Definition	A name given to a time table version, e.g., summer.

SCH_TripDesignator_id/UCS

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TripDesignator_id/UCS
Definition	A unique alpha-numeric designator (identifier) of a trip.

SCH_TripID_id

(1) The Representative class term (in descriptive name and field) was modified to identifier (id).
(2) The definition was modified.

Descriptive Name	SCH_TripID_id
Definition	A unique number assigned to a trip.
Representation class term	identifier

SCH_TripTimePointDescription_txt/UCS

(1) Retired data element.

SCH_TripTimePtAttribute_cd

(1) The error codes were removed from the code list.
(2) The definition was modified.

Definition	An attribute of a time point in the context of a trip.
Representation layout	SCH-TripTimePtAttribute ::= INTEGER { layover (1), -- Layover relief (2), -- Relief control (3), -- Control transfer (4), -- Transfer recovery (5), -- Recovery pullIn (6), -- Pull in pullOut (7), -- Pull out maxLoadPt (8), -- Maximum load point arrive (9), -- Arrive depart (10), -- Depart

```
 schedAdhOn (11), -- Schedule Adherence On
 schedAdhOff (12), -- Schedule Adherence Off
 rtAdhOn (13), -- Route Adherence On
 rtAdhOff (14) -- Route Adherence Off
   -- 15-149 reserved
  -- 150-255 local use
} (0..255)
```

Valid value rule

1 Layover
2 Relief
3 Control
4 Transfer
5 Recovery
6 Pull in
7 Pull out
8 Maximum load point
9 Arrive
10 Depart
11 Schedule Adherence On
12 Schedule Adherence Off
13 Route Adherence On
14 Route Adherence Off
15-149 Reserved
150-255 Local use

SCH_TripTimePtTime_tm/SI-time

(1) Retired data element.

SCH_TripType_cd

(1) The error codes were removed from the code list.
(2) The definition was modified.

Definition

A classification of a trip, whether revenue or non-revenue.

Representation layout

```
SCH-TripType  ::= INTEGER {
  revenue (1) ,  -- Revenue
  pullIn (2),   -- Pull In (from vehicle base)
  pullOut (3),  -- Pull Out (to vehicle base)
  deadhead (4),  -- Deadhead
  extra (5),   -- Extra
  standby (6),  -- Standby
  garTransfer (7),  -- Garage transfer
  roadCall (8),  -- Road call
  roadCallReturn (9), -- Road call return
  roadTest (10),  -- Road test
  invalidMovement (11) -- Invalid movement
    -- 14-149 reserved
   -- 150-255 local use
} (0..255)
```

Valid value rule

0 escape
1 Revenue
2 Pull In (from vehicle base)
3 Pull Out (to vehicle base)
4 Deadhead
5 Extra
6 Standby
7 Garage transfer
8 Road call
9 Road call return
10 Road test
11 Invalid movement
12-149 Reserved

150-255 Local use
Describe local use codes in CptCodeList.

SCH_PassengerMiles_nbr / NTD

Add new data element.

Descriptive Name	SCH_PassengerMiles_nbr / NTD
Descriptive Name Context	Manage Transit
Definition	A measure of service utilization that represents the culumative sum of the distances ridden by all passengers. It is normally calculated by summation of the passenger load multiplied by the distance between two transit stop points. For example, ten passengers riding in a transit vehicle for two miles equal 20 passenger miles, the value of the object is 20.
Formula	
Source	
Class Name	SCH
Classification scheme name	TCIP
Classification scheme version	NTCIP 1400
Data concept type	Data Element
Keyword	
Related data concept	
Relationship type	
Remarks	
Symbolic name	sch 65
Symbolic name usage	
ASN1 name	SCH-PassengerMiles
Representation layout	number
Constraints	
Value Domain	NTD definition
Data type	ULONG
Representation class term	SCH-PassengerMiles ::= ULONG
Valid value rule	

4.2 MESSAGES OBJECTS

SchActivateDriverMessage_message

(*1) Changed name of message to SchActivateDriverMessage for additional clarity.*

Descriptive name	SchActivateDriverMessage_message

SchBlockGroup_message

(1) The definition was modified.

Definition	A grouping of vehicle assignments, for example, on common characteristics such as use common corridor, terminus, or route direction name.

SchMasterSchedule_message

(1) The definition was modified.

Definition

A table that includes all the time points and trips on a route. Contained within the SchRoute is the Master Schedule Header information. Contained within SchTrip is the day type information.

SchPattern_message

(1) Message Body: add field --
path-alignment SpRouteclass OPTIONAL
(2) The definition was modified.

Definition

A sequence of points and events that define a route segment.

Message body

```
SchPattern ::=SEQUENCE {
pattern-designator SCH-PatternDesignator,
pattern-id SCH-PatternID,
pattern-name SCH-PatternName OPTIONAL,
note-id SCH-NoteID OPTIONAL,
route-direction SCH-RouteDirectionName OPTIONAL,
route-id SCH-RouteID,
time-points SEQUENCE OF SCH-TimePointId,
stop-points SEQUENCE OF CPT-StopPointID,
triggers SEQUENCE OF SCH-ActivationID OPTIONAL,
mode CPT-Mode OPTIONAL,
path-alighnment SpRouteclass OPTIONAL,
timetable-version SCH-TimeTableVersionID OPTIONAL
}
```

SchPieceOfWork_message

(1) The definition was modified.

Definition

A piece of an operator's assignment.

SchRoute_message

(1) The definition was modified. Added "with a common route identifier."

Definition

A collection of patterns in revenue service with a common route identifier.

SchRun_message

(1) The definition was modified.

Definition

A transit operator's daily assignment.

SchRunningTimePeriod_message

1. Add two new field to message:
assignments SEQUENCE OF SchRunningTimeAssignment
and
name SCH-RunningTimePeriodName

Message body

```
SchRunningTimePeriod ::=SEQUENCE{
name SCH-RunningTimePeriodName,
begin-time SCH-TimeBegin,
end-time SCH-TimeEnd,
mode CPT-Mode OPTIONAL,
timetable-version SCH-TimeTableVersionID OPTIONAL,
day-type SCH-DayType OPTIONAL,
date CPT-CalendarDate OPTIONAL,
```

```
assignments  SEQUENCE OF SchRunningTimeAssignment
}
```

SchTimePoint_message

(1) The definition was modified.

Definition A point along a route where trips are assigned arrival or departure times.

SchTimePointInterval_message

(1) The definition was modified.

Definition A one-way path of travel between two consecutive time points on a block.

SchTrip_message

(1) The definition was modified.
(2) Add new fields and removed some fields from the message body.
-- added SCH-TripDesignator as OPTIONAL and made SCH-TripID OPTIONAL; required at least one of these to be included in the message (using WITH COMPONENTS)
-- added OB-BlockIDShort OPTIONAL
-- replaced trip-timepoint-times SEQUENCE OF SCH-TripTimePtTime with tripTimePoint SchTripTimePoint

Definition A one way scheduled movement of a transit vehicle between two terminals.

Message body

```
SchTrip::=SEQUENCE  {
  trip-id   SCH-TripID OPTIONAL,
  trip-designator  SCH-TripDesignator OPTIONAL,
  service-type  SCH-ServiceType,
  day-type  SCH-DayType,
  route-id  SCH-RouteID,
  patterns  SEQUENCE OF SCH-PatternID  OPTIONAL,
  run-id  SCH-RunID  OPTIONAL,
  block-id   SCH-BlockID  OPTIONAL,
  block-id-short  OB-BlockIDShort OPTIONAL,
  trip-type  SEQUENCE OF SCH-TripType  OPTIONAL,
  trip-timepoint  SchTripTimePoint,
  event   SEQUENCE OF SchEvent OPTIONAL,
  note SCH-NoteID OPTIONAL,
  mode  CPT-Mode  OPTIONAL,
  timetable-version  SCH-TimeTableVersionID OPTIONAL
}  -- one of these fields must be present in the message
 (WITH COMPONENTS {..., trip-id PRESENT } |
  WITH COMPONENTS {..., trip-designator PRESENT} )
```

SchTripTimePoint_message

(1) Message body: SCH-NoteID were OPTIONAL.

Message body

```
SchTripTimePoint::=SEQUENCE {
timepoint-id   SCH-TimePointID OPTIONAL,
timepoint-designator  SCH-TimePointDesignator  OPTIONAL,
trip-timepoint-time  SCH-TripTimePtTime,
note   SCH-NoteID OPTIONAL,
trip-timepoint-attr  SCH-TripTimePtAttribute  OPTIONAL,
mode  CPT-Mode OPTIONAL,
timetable-version  SCH-TimeTableVersionID  OPTIONAL
}
(WITH COMPONENTS {...,timepoint-id PRESENT}|
WITH COMPONENTS {...,timepoint-designator PRESENT})
```


SchVehicleAssign_message

(1) Add new field --
vehicle-attributes SEQUENCE OF CPT-PTVehicleAttributes OPTIONAL

Message body

```
SchVehicleAssign ::=SEQUENCE {
block-id  SCH-BlockID,
block-id-short  CC-BlockIDShort OPTIONAL,
block-designator  SCH-BlockDesignator OPTIONAL,
block-name  SCH-BlockName  OPTIONAL,
pullout-time  SCH-PulloutTime  OPTIONAL,
pullin-time  SCH-PullinTime  OPTIONAL,
pullOut-location  SpPointclass  OPTIONAL,
--refers to the pull-out location
pullIn-location  SpPointclass  OPTIONAL,
--refers to the pull-in location
day-type  SCH-DayType,
trips  SEQUENCE OF SCH-TripID,
ptv-type  CPT-PTVehicleType  OPTIONAL,
agency  CPT-AgencyID  OPTIONAL,
ptv-base  CPT-PTVehicleBaseName  OPTIONAL,
vehicle-attributes  SEQUENCE OF CPT-PTVehicleAttribute OPTIONAL,
organizational-unit  CPT-OrganizationalUnitID  OPTIONAL,
note  SCH-NoteID  OPTIONAL
timetable-version  SCH-TimeTableVersionID  OPTIONAL
}
```

SchRunningTimeAssignment_message

Add new message

Message identifier sch 24

Metadata source Direct

Descriptive name SchRunningTimeAssignment_message

Descriptive name context Manage Transit

Definition The time assigned to a vehicle to operate between two points along a path.

Source

Class name SCH

Classification scheme name TCIP

Classification scheme version NTCIP 1400

Data concept type Message

Keyword

Related data concept

Relationship type

Remarks

Symbolic name

Symbolic name usage

ASN1 Name SchRunningTimeAssignment

Constraints

Message body

```
SchRunningTimeAssignment ::= SEQUENCE {
runningTime  SCH-RunningTimeSched,
link  CHOICE {
    tpi        SCH-TimePointIntervalID,
    pattern SCH-PatternID,
    route    SCH-RouteID },
note  SCH-NoteID OPTIONAL,
serviceType  SCH-ServiceType  OPTIONAL,
```

timetable-version SCH-TimeTableVersionID OPTIONAL
}

SchMasterSchedulePackage_message

Add new message

Message identifier	sch 23
Metadata source	Direct
Descriptive name	SchMasterSchedulePackage_message
Descriptive name context	Manage Transit
Definition	A table that includes a specified group of Master Schedules (as defined in SchMasterSchedule).
Source	
Class name	SCH
Classification scheme name	TCIP
Classification scheme version	NTCIP 1400
Data concept type	Message
Keyword	
Related data concept	
Relationship type	
Remarks	The master schedule may be grouped by the following: all routes vehicle identifiers organization list (e.g., vehicle or operator base) block list run list geographic area pattern list radio zone agency or 3 types of user defined lists.
Symbolic name	
Symbolic name usage	
ASN1 Name	SchMasterSchedulePackage
Constraints	
Message body	SchMasterSchedulePackage ::= SEQUENCE { address-group CC-MsgAddressGroup, full NULL OPTIONAL, --all routes if included, address-group =0 route-list SEQUENCE OF SCH-RouteID OPTIONAL, --address-group= 1 ptv-list SEQUENCE OF CPT-PTVehicleID OPTIONAL --address-group= 4 organization-list SEQUENCE OF CPT-OrganizationalUnitID OPTIONAL, --address-group=2 block-list SEQUENCE OF SCH-BlockID OPTIONAL, --address-group= 5 run-list SEQUENCE OF SCH-RunID OPTIONAL, --address-group= 6 area-list SEQUENCE OF SpPolygonclass OPTIONAL, --address-group= 3 pattern-list SEQUENCE OF SCH-PatternID OPTIONAL, --address-group=7 radio-zone-list SEQUENCE OF CPT-RadioZoneID OPTIONAL, --address-group=11 agency-list SEQUENCE OF CPT-AgencyID OPTIONAL, --address-group=12 other-list SEQUENCE OF OCTET STRING OPTIONAL,


```
   --address-group=13-15 (user defined)
  masterSchedule-route  SEQUENCE OF SchMasterSchedule
  patternList SEQUENCE OF SchPattern OPTIONAL,
            -- master list of patterns associated with contents of package
  timepointList SEQUENCE OF SchTimePoint OPTIONAL,
            -- master list of time points associated with contents of package
  stopPointList SEQUENCE OF CptStopPoint OPTIONAL
            -- master list of stop points associated with contents of package
}
(WITH COMPONENTS {...,full PRESENT}|
WITH COMPONENTS {..., route-list PRESENT}|
WITH COMPONENTS {..., organziation-list PRESENT}|
WITH COMPONENTS {..., area-list PRESENT}|
WITH COMPONENTS {..., ptv-list PRESENT}|
WITH COMPONENTS {...,block-list PRESENT}|
WITH COMPONENTS {..., run-list PRESENT}|
WITH COMPONENTS {..., pattern-list PRESENT}|
WITH COMPONENTS {..., radio-zone-list PRESENT}|
WITH COMPONENTS {..., agency-list PRESENT}|
WITH COMPONENTS {..., other-list PRESENT})
```

Section 5
CONFORMANCE REQUIREMENTS

-- no change

Annex A
DATA ELEMENT/MESSAGE USE CROSS REFERENCE TABLE

(Informative)

Annex B
ASN.1 Script

(Informative)

-- removed from document